1922MNRAS..82..439D

The last slide shown was of a school football team including Professor Turner and Lord Haig in their school days; the inclusion of the portrait of the latter was justified by the suggestion that without his aid they might not be keeping their Centenary Celebration even two years late.

Professor Aitken then temporarily occupied the Chair, and gave a short account of the conditions of the award of the Bruce gold medal. He said that candidates must be recommended, on impartial grounds, by the directors of six of the leading Observatories of the world. This year the choice had fallen on the Astronomer Royal of England, Sir Frank Dyson, to whom he was empowered to give the medal at that meeting, which he proceeded to do.

At the conclusion of the Meeting, Members present were photographed in the Court of Burlington House (Plate 11).

The afternoon Meeting opened at 2.30, Professor Eddington, President, in the Chair. The proceedings commenced with the reading by the Secretary of the minutes of the inaugural Meeting, held on 1820 January 12, at the Freemason's Tavern, Great Queen Street, Lincoln's Inn Fields. Mr. Daniel Moore was elected Chairman, Mr F. Baily, Secretary, and John Herschel was among those present, all of whom signed an undertaking to support the formation of an Astronomical Society. The first Meeting of the newly-formed Society was held a month later, at the rooms of the Geological Society, Bedford Street, Covent Garden.

The President then called upon six Foreign Associates to speak on the work on which they were engaged.

Dr. Seares spoke on the photographic study of colour-indices that was in progress at Mt. Wilson; the method consisted in finding the exposure ratio for similar images in different regions of the spectrum. The result emerged that in stars of the same spectral type the dwarfs are redder than the giants; this holds more strongly for the types from F5 to M. This may be expressed by saying that the colour-index is a function both of type and of absolute magnitude. It appears that in the galaxy the opposite holds, the brighter stars being redder. The distribution of absolute magnitudes is therefore a function of galactic latitude. Among the extra-galactic stars a large number had been identified as dwarfs.

Professor Strömgren spoke on the studies concerning the problem of Three Bodies which were being carried on at Copenhagen. The method followed was that used by Sir George Darwin in his studies of periodic orbits, and consisted in the numerical calculation by mechanical quadratures of various assumed cases. In the early work on the problem the third mass was usually taken to be infinitesimal, so that the other two bodies moved in undisturbed Keplerian orbits; but they were now commencing the attack on the general case, where all three masses are finite. Going back, however, to the first case, it might be subdivided into the following classes:—

(1) Third Body moving in a direct orbit about one of the Masses.
(2) Third Body moving in a retrograde orbit about one of the Masses.
(3) Third Body moving in an orbit about both of the Masses.
(4) Third Body moving in a librational orbit about an equilibrium point.

1922MNRAS..82..439D

Cases 1 and 2 could each be further subdivided into two, according as the third body went round the principal or the secondary mass; case 4 was that of the Trojan group of minor planets. Examples of all these cases were being worked out numerically; some of them had already been published.

Professor Harlow Shapley spoke on the method he was now carrying out of deducing the absolute magnitudes of stars from the series of spectral plates taken with Objective-Prism Spectrographs at Mt. Wilson and at Harvard. It was possible to deduce results in a much more wholesale manner from these than from the large-scale spectra employed by Professor Adams for the purpose, but of course the probable error was larger, owing to the small size of the spectra. The region of the spectrum that they principally employed was the cyanogen band, which they found to be stronger in dwarfs than in giants. Together with this work they were also examining star photographs taken at an interval of several years, for the detection of stars with sensible proper motions, which in most cases proved to be dwarfs with considerable parallaxes.

They were also studying the distribution of stars of different spectral types in various regions of the sky. They found that the brighter stars of type B grouped themselves along Gould's belt, which is inclined several degrees to the galactic equator; on the other hand the faint B stars grouped themselves along the galactic equator. The conclusion is that there is a local cluster containing the sun, the equator of the cluster being somewhat inclined to the galactic equator.

Practically no B stars are found above galactic latitude 30°. By finding the average number of stars of each type per unit of area, and then subtracting this number from that in the galactic zone, they found the galactic excess; in this way it was deduced that the B stars are all in or near the galaxy, that the A stars also show a large peak there, and the K stars a small peak, while the other types show practically no galactic excess. He also mentioned that Professor Baily had gone to Arequipa, and that one of his chief fields of work there would be the Magellanic Clouds. They had lately found some Cepheids of short period in the greater cloud analogous to those found in the globular clusters. Their apparent magnitudes accorded well with the adopted distances of the cloud and of the clusters.

He also alluded to an investigation of the relative speed of blue and yellow light by simultaneous photographs of the variables in certain globular clusters taken with plates sensitised for light of different colours. The results gave the maximum possible difference in the speed (assuming that his adopted distances of the clusters were correct) as one part in ten thousand millions.

Professor Hertzsprung spoke on the photometric work on certain variables on which he had been engaged while at Potsdam. The star RR Lyræ has a period of thirteen hours, but from differences in the successive cycles he had deduced that there was also a longer period of forty days, or 71·64 times the length of the short period. RR Lyræ was interesting since it was a short-period Cepheid, apparently of the same type as the cluster variables. It appeared to have three different periodicities, one of a few hours, one of forty days, and one of several years. There were

1922MNRAS..82..439D

several other stars whose light-curve seemed to exhibit slow secular changes, not always in the same direction. δ Cephei was being investigated, in the endeavour to establish beyond doubt the secular change of period.

Professor Aitken spoke on Double-Star observation. He had in hand the study of the distribution of double-stars over the sky. Burnham's survey, splendid as it was, was not exhaustive. His own survey extended to all stars within 130° of the North Pole, and not fainter than the ninth magnitude, there being also a convention of distance between components, depending on magnitude, beyond which a star should not be classified as double. In the course of the work some three thousand new doubles had been discovered, of which some 15 per cent. already exhibited orbital motion. The theoretical researches included the causes of duplicity, the explanation of the wide gap between spectroscopic and visual binaries, and the correlation of duplicity with absolute magnitude. He noted that Mr. Innes had undertaken the region south of 130° N.P.D., indeed he went a little further north, so as to have an overlap with the northern.

Professor St. John said they had been testing Mr. Evershed's announcement that the spectrum of Venus showed an apparent Earth-effect, producing a displacement of lines towards the red. Their conclusion was that the effect was probably due to the different altitude of the planet at different stages in the synodic period; differential refraction between the visual and photographic image on the slit would explain it. Their Venus spectrograms had such a high dispersion that the planetary and telluric lines were widely separated by the Doppler effect. They were surprised to find a complete absence of the lines of oxygen and water vapour from the planet's spectrum; they had calculated that a metre of oxygen or a few millimetres of water vapour at atmospheric pressure would have given a visible effect. They were investigating the Venus spectra with a view to determining the rotation period. At present he would only say that he did not think that it was less than fifteen days.

He then described the repetition of the Michelson-Morley experiment. The platform was constructed of concrete reinforced by copper, which was chosen as being non-magnetic; a certain amount of shift was detected in the velocity of the beam, but it was only 8 or 10 per cent. of the amount calculated on the assumption that the experiment should show motion through the ether.

Going on to speak of the search for the shift in the solar spectral lines predicted by Einstein, he said that the cyanogen bands were unsuited for this problem, owing to their liability to temperature effect. A general study of lines in all parts of the spectrum was now being made; he could state that if the Einstein effect was present it was partially veiled by some other agency; a shift towards the red is shown, but the amount is not proportional to the wave-length. The research is being made both with the grating and the interferometer. He gave for the measured shift in the red region one-third of the Einstein amount; the strong lines in the violet agreed with this figure, but the weak ones gave twice the Einstein shift. They had made some

1922MNRAS..82..439D

measures of the interval between the magnesium lines at 4481 which exactly confirmed those of Professor Fowler.

(*Note.*—The above brief summaries of the six speeches are admittedly incomplete, but it is hoped that they do not seriously misrepresent the speakers' meaning. They have not been submitted to them for correction, as this would have caused serious delay in the appearance of the Number.)

The Society dined in the evening at the Criterion Restaurant. Most of the Fellows and Associates who were present at the morning Meeting (see list accompanying Plate 11) were at the dinner, many of them accompanied by their wives or by friends. The following were invited as guests of the Society:—The Earl of Balfour, Sir J. J. Thomson, Sir W. Bragg, Sir E. E. Rutherford, Professor Seward (President of the Geological Society), Admiral Learmonth (H.M. Hydrographer), Professor Richmond (President of the London Mathematical Society), Dr. Chree (President of the Royal Meteorological Society), Dr. Russell (President of the Physical Society), Sir T. Petavel (Director of the National Physical Laboratory), Dr. Simpson (Director of the Meteorological Office), and Major Hepburn (President of the British Astronomical Association).

After the toasts of the King and the Royal Family, the Earl of Balfour proposed the toast of the Royal Astronomical Society in the following speech, the report of which is taken from the *Morning Post* of May 31.

He said they were just 100 years old, or, if he was to speak with astronomical accuracy, 102 years old. If the founders of that institution could have foreseen the progress of their beloved science some of them would have had certain misgivings. He believed that their first President resigned quite early because he was afraid that the Society would trespass on the ground reserved for the great Royal Society. That man misunderstood both the work of that Society and the unshakable position which the Royal Society possessed in the leadership of Science in the British Empire. None of those evil prognostications had come true.

When the relatively small body of astronomers met together to found that Society he supposed that, on the whole, what they looked forward to was that in the next 100 years increased accuracy of observation, and perhaps improved instruments, would enable them to refine and bring to a great perfection what might broadly be called the Newtonian scheme of the heavenly architecture. They certainly never foresaw that beyond the purely mechanical view of the heavens, beyond the field of mere improvement in precision and accuracy of instruments, there was going to be a whole new field of scientific speculation opened in all directions by the growth of physics, optics, and of the collateral sciences, which together enabled us to understand somewhat better the vast and glorious mystery which surrounded us, and which we saw every night.

The work astronomers had done in that hundred years was marvellous, and he rejoiced to think that on an occasion like that men interested in this particular science had come together in this disturbed world and were able to forget, round that table, discussing